

10/634,742 filed 08/04/2003
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Reply to Office Action of 08/16/2006

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REMARKS/ARGUMENTS

Claims 1-50 are pending in the above-captioned application. Of these claims, claims 1-7, 9-18, 20-25, and 27-32 stand rejected, and claims 8, 19, 26, and 33-50 are withdrawn from consideration. With this paper, claims 1, 3-5, 10-15, 17, 20-22, 30, and 32 have been amended, claims 2, 7, 9, 16, 27-29, and 33-50 have been canceled, and claims 51-69 have been added. No new matter was added with the amendment.

I. Election/Restrictions

Applicants elected without traverse to prosecute the invention of Group I (claims 1-32), restricting the species to associative interaction (claims 6, 7, and 25) and fluorescence (from claim 18); thus electing claims 1-7, 9-18, 20-25, and 27-32. As a result, claims 8, 19, 26, and 33-50 are withdrawn from consideration. To simplify prosecution of this case, Applicants are canceling claims 33-50, while retaining the right to pursue those claims in a divisional application. The cancellation of the non-elected claims does not necessitate an amendment to the inventorship. Upon allowance of a generic claim, Applicants will be entitled to consideration of claims to additional species (i.e., claims 8, 19, and 26) that depend from or otherwise require all the limitations of an allowable generic claim (i.e., claim 1 and/or claim 11).

New claims 51-69 have been added. All of these claims fall within the subject matter of Group 1. None of these claims falls within the subject matter of the nonelected species.

II. Claim rejections under 35 U.S.C. § 112, second paragraph

Claims 1-8 [*sic*], 9-18, 20-25, and 27-32 were rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter that Applicants regard as the invention. Each of the Examiner's reasons for rejecting these claims have been addressed in the amendments made to the still-pending claims.

To address the Examiner's concerns at items 6 and 8 of the present Office action, Applicants have amended claims 1 and 11 to clarify that an interaction between a first plurality of molecules and a second plurality of molecules is being determined. In currently amended claim 1 and new independent claim 51, the first plurality of molecules comprises a ligand, while the second plurality of molecules comprises a receptor. In currently amended independent

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claim 11 and new independent claim 65, the first plurality of molecules comprises an enzyme, while the second plurality of molecules comprises a substrate.

Support for two pluralities of molecules interacting can be found throughout the specification: on page 8 in paragraph 0048 and page 9 in paragraph 0052 (small and large molecules), and on page 11 in paragraph 0058 (biochemical molecules). That the pluralities of molecules may comprise an enzyme, a substrate, a ligand, or a receptor can be found, for example, on page 9 in paragraph 0051 and on page 11 in paragraph 0057, as well as in original claims 7, 9, and 27-29.

Claim 1 has been further amended to recite that a mixture of the first and second pluralities of molecules are flowed in a fluidic conduit using pressure. That a mixture is flowed is supported on, for example, page 13 in paragraph 0065, on page 16 in paragraph 0076, on page 17 in paragraph 0077, on page 18 in paragraphs 0081 and 0084, and on page 19 in paragraph 0086. That the mixture is flowed using pressure is supported in original claim 2, which has been canceled with this paper.

As demonstrated above, no new matter was added with the amendments to independent claims 1 and 11. The dependent claims have been amended to conform the terminology of these claims to the claims from which they depend.

With respect to the Examiner's comments at item 6 of the current Office action regarding the phrase "the dispersion," Applicants wish to point out that independent claims 1 and 11 have been amended to recite "the dispersion measurement" rather than "the dispersion." Antecedent basis for "the dispersion measurement" is provided by step (b) in claim 1 and step (c) in claim 11.

In response to the Examiner's comments at item 7 of the current Office action, Applicants have deleted the phrase "wherein the dispersion of the molecules is Taylor-Aris dispersion."

The Examiner's comments at item 8 have been addressed previously.

Applicants respectfully submit that with the above-described amendments, independent claims 1 and 11 have been rendered definite. Therefore, the independent claims no longer depend from claims deemed by the Examiner to be indefinite and so are no longer themselves indefinite, thus addressing the Examiner's concerns at item 9.

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Applicants wish to point out that no new matter was added with claims 51–69. All of the limitations recited in these claims were present in the original claims or are supported within the specification at locations identified above with respect to amended independent claims 1 and 11.

III. Claim rejections under 35 U.S.C. § 102(b) as being anticipated by Loh et al. (Langmuir 10, 3431–3434)

Claims 1–6, 9, 11, 13–18, 20, 21, 25, 27, 30, and 32 were rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Loh et al., Taylor-Aris diffusion studies of solute-polymer interactions, *Langmuir* 10, 3431–3434, 1994 (“Loh et al.”). This rejection is respectfully traversed. “[F]or anticipation under 35 U.S.C. § 102, a single reference must teach every aspect of the claimed invention either explicitly or impliedly. Any feature not directly taught must be inherently present.” MPEP § 706.02. “The identical invention must be shown in as complete detail as is contained in the . . . claim.” *Richardson v. Suzuki Motor Co.*, 868 F.2d 1226, 1236, USPQ2d 1913, 1920 (Fed. Cir. 1989).

With regard to amended independent claims 1 and 11, at a minimum, Loh et al. do not teach a first plurality of molecules comprising a ligand and a second plurality of molecules comprising a receptor, or a first plurality of molecules comprising an enzyme and a second plurality of molecules comprising a substrate. This is acknowledged by the Examiner at the bottom of page 6 of the present Office action: “Loh et al. do not teach that the plurality of molecules comprises a receptor and ligand, or more specifically, an enzyme and substrate.” Thus, Loh et al. do not teach every aspect of the claimed invention either explicitly or impliedly, nor do they show the identical invention claimed by Applicants in as complete detail as is contained in amended independent claims 1 and 11. Withdrawal of the rejection of claims 1 and 11 under § 102(b) as being anticipated by Loh et al. is, therefore, respectfully requested.

Claims 3–6 depend directly or indirectly from amended independent claim 1, while claims 13–15, 17, 18, 20, 21, 25, 30, and 32 depend directly or indirectly from amended independent claim 11. Therefore, Applicants respectfully submit that these dependent claims are allowable for at least the same reasons as set forth herein with respect to amended independent claims 1 and 11. Withdrawal of the rejection of dependent claims 3–6, 13–15, 17, 18, 20, 21, 25,

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30, and 32 under § 102(b) as being anticipated by Loh et al. is respectfully requested. As previously noted, independent claims 2, 9, 16, and 27 have been canceled.

IV. Claim rejection under 35 U.S.C. § 102(b) as being anticipated by Loh et al. in light of Bello et al. (Science 266, 773-776)

Claim 31 was rejected under 35 U.S.C. § 102(b) as allegedly being anticipated by Loh et al. in light of Bello et al., Use of Taylor-Aris dispersion for measurement of solute diffusion coefficient in thin capillaries, *Science* 266, 773-776, 1994 ("Bello et al."). This rejection is respectfully traversed. Rejection of a claim under § 102(b) requires that a single reference teach every aspect of the claimed invention either explicitly or impliedly or that the feature be inherently present. As previously shown, claim 11 is allowable over Loh et al. The Examiner has not shown that claim 11 is anticipated by Bello et al. The feature is not inherently present, regardless of the teachings of Bello et al., because Applicants' claim 4 demonstrates that measuring longitudinal dispersion in the axis of flow is not the only means, and therefore an inherent means, for measuring Taylor-Aris dispersion. Therefore, claim 31 is allowable over the combination of Loh et al. and Bello et al.

Further, claim 31 depends directly from amended independent claim 11. Therefore, Applicants respectfully submit that claim 31 is allowable for at least the same reasons as set forth herein with respect to amended independent claim 11. Withdrawal of the rejection of claim 31 under § 102(b) as being anticipated by Loh et al. in light of Bello et al. is respectfully requested.

V. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Loh et al. in view of Hefti (US 6,287,874)

Claims 7, 28, and 29 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Loh et al. in view of US 6,287,874 to Hefti ("Hefti"). To warrant rejection under 35 U.S.C. § 103(a), all the claim limitations must be taught or suggested by the prior art. MPEP § 2142. Further, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. MPEP § 2143. The claimed invention must be

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considered as a whole. The references must be considered as a whole and must suggest the desirability and thus the obviousness of making the combination. MPEP § 2141(II). Applicants respectfully submit that no motivation or suggestion exists to combine the references cited by the Examiner.

As demonstrated above, and as acknowledged by the Examiner, "Loh et al. do not teach that the plurality of molecules comprises a receptor and ligand, or more specifically, an enzyme and substrate," these combinations being recited in original claims 7, 28, and 29, the limitations of which have been incorporated into amended independent claims 1 and 11 and new independent claims 51 and 65. The Examiner cites Hefti as providing the missing teaching, stating on page 6 of the present Office action that Hefti "teaches the measurement of enzyme/substrate interactions (column 6, lines 23-45) involving measurement of dispersion effects (column 26, lines 1-5)."

The passage at column 26, lines 1-5, states that molecules "are distinguishable from one another based upon their unique dielectric properties which include dispersion effects" I.e., this passage refers to dielectric dispersion, which is entirely different from Taylor-Aris dispersion. Dielectric dispersion is explained in column 26, lines 12-36, of Hefti:

The frequency band over which the molecule exhibits a dramatic dielectric change is often referred to as the molecule's dispersion regime.... The molecule's dielectric properties can be observed by coupling a test signal to the molecule and observing the resulting signal. When the test signal excites the molecule at a frequency within the molecule's dispersion regime, especially at a resonant frequency, the molecule will interact strongly with the signal, and the resulting signal will exhibit dramatic variations in its measured amplitude and phase, thereby generating a unique signal response. This response can be used to detect and identify the bound molecular structure. In addition, because most molecules will exhibit different dispersion properties over the same or different frequency bands, each generates a unique signal response which can be used to identify the molecular structure.

By contrast, Taylor-Aris dispersion is a pressure-based flow phenomenon. Applicants define the term "dispersion" on page 7 of the application in paragraph 0043 as "convection-induced, longitudinal dispersion (sample broadening) of material within a fluid medium due to velocity variations across streamlines in laminar pressure-driven flow."

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Therefore, no suggestion or motivation exists, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the teachings of Loh et al., which pertain to fluid mechanics (Taylor-Aris dispersion), with those of Hefti, which pertain to electric fields (dielectric dispersion). As previously noted, claims 7, 28, and 29 have been canceled with the present paper, and the limitations of these claims have been incorporated into amended independent claims 1 and 11 and new independent claims 51 and 65. Based on the foregoing arguments, Applicants respectfully submit that these amended and new independent claims are nonobvious over the combination of Loh et al. and Hefti.

VI. Claim rejections under 35 U.S.C. § 103(a) as being unpatentable over Loh et al.

Claims 10 and 22-24 were rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Loh et al. Claim 10 depends directly from amended independent claim 1, while claims 22-24 depend directly or indirectly from amended independent claim 11. Any claim depending from a nonobvious claim is also nonobvious. See MPEP § 2143.03 and *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988). Therefore, dependent claims 10 and 22-24 are nonobvious. Withdrawal of the rejection of these claims as being unpatentable over Loh et al. is, therefore, respectfully requested.

VII. Claim rejection under 35 U.S.C. § 103(a) as being unpatentable over Loh et al. in view of Parce et al. (US 6,149,870)

Claim 12 was rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Loh et al. in view of Parce et al., US 6,149,870. Claim 12 depends directly from amended independent claim 11. As any claim depending from a nonobvious claim is also nonobvious, dependent claim 12 is nonobvious. Withdrawal of the rejection of this claim as being unpatentable over Loh et al. in view of Parce et al. is, therefore, respectfully requested.

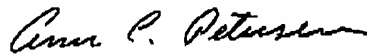
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Conclusion

For the foregoing reasons, Applicants believe all the pending claims are in condition for allowance and should be passed to issue. If the Examiner believes that a telephone interview would expedite the examination of this application, the Examiner is requested to contact the undersigned attorney at the telephone number provided below.

Respectfully submitted,



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I hereby certify that this correspondence is being facsimile transmitted to the USPTO or deposited with the United States Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on November 16, 2006, by Ann C. Petersen.

Signed: _____

